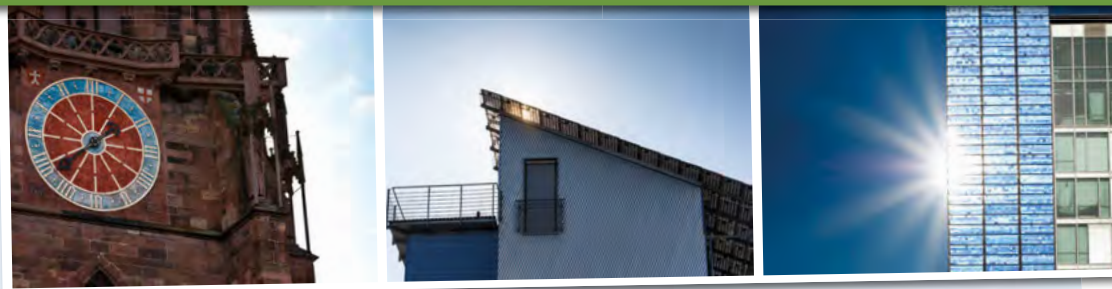




APPROACHES TO SUSTAINABILITY



[GREENCITY FREIBURG]



www.freiburg.de/greencity



Management
Marketing

FWTM
FREIBURG

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More than just climate protection: Freiburg's sustainability process

It is with some justification that Freiburg regards itself as one of the birthplaces of the environmental movement. Freiburg's sustainability process began as far back as the 1970s with the successful action against the Wyhl nuclear power plant, one of the founding myths of the alternative-green movement. This was then continued by socio-civic initiatives that formed part of the "Local Agenda 21" process and the signing of the Aalborg Commitments, as well as the associated sustainability targets set by the Freiburg Sustainability Council and adopted by the Municipal Council in 2009, which form the basis for any political action.

The Sustainability Management unit was set up at the start of 2011 as a coordination and central control office, to systematically develop the 'green profile' of the City of Freiburg for the future. Reporting directly to the Lord Mayor, its role involves developing an integrated sustainability management policy to steer the city's overall urban sustainability process, pooling experiences and acquiring new skills to meet future challenges.



A wealth of projects and the innumerable activities and initiatives that help to implement Freiburg's sustainability targets, attest to the city's comprehensive commitment to sustainable development. For its commitment, the city of Freiburg was honoured with the German Sustainability Award in 2012, presented for the first time to towns and municipalities, as the most sustainable city in Germany. The prize was awarded specifically to reflect the city's unique sustainability infrastructure, comprising the Sustainability Management unit reporting to the Lord Mayor, as well as the commitment of urban societies, offices and agencies combined with an active body of citizens.

Freiburg is regarded today as a model for the reconciliation of "soft" ecology and "hard" economics. Environmental policy, solar technology, sustainability and climate protection have become the drivers of economic and political growth along with urban development. And yet, what matters even more than prizes and global back-slapping, is the fact that the people of Freiburg identify strongly with this policy and their city.

www.freiburg.de/greencity
www.freiburg.de/nachhaltigkeitsmanagement

Green City Milestones

- Fraunhofer Institute for Solar Energy Systems ISE set up
- Waste Management Concept adopted; refundable container concept introduced
- Construction of the "Heliotrope", the world's first energy-plus house
- "Freiburg Regional Public Transport Authority" set up
- Aalborg Charter signed
- Climate Protection Plan: 25% reduction in CO₂ emissions by 2010
- 1st German 'passive' apartment building; Freiburg Regional Energy Agency created

1975	1977	1979	1981	1986	1991	1992	1994	1995	1996	1998	1999	2000
Resistance to the Wyhl nuclear plant	Foundation of the Oeko-Institute	1 st solar apartment building in Freiburg		City resolves to phase out nuclear energy; Environmental Protection Office set up		Low-energy construction for urban buildings standard; 1 st solar house self-sufficient in terms of energy		Construction of the Rieselfeld district; West Rieselfeld designated a nature conservation zone		Construction of Vauban district		Attendance at World EXPO Hanover; launch of "Intersco" in Freiburg



[Green for "Go!"]



A sustainable urban and transport policy, as well as an effective climate protection and environmental policy, are founded on a number of cornerstones: energy from sustainable sources, attractive and sustainable transport provision and low-energy standards in house-building, to cite just a few examples.

In Freiburg, sustainability is a crucial city-wide, cross-departmental responsibility – municipal politicians and government, together with the scientific and business community work hand in hand to achieve sustainable urban development. This approach is driven forward by the inhabitants of the city, whose commitment and involvement represent the foundation of a viable and sustainable community. Freiburg has become the model "Green City" for many cities and towns worldwide. We are honoured by this recognition, which is also something that inspires us to encourage innovation and work together towards our goals with enthusiasm and positive spirit.

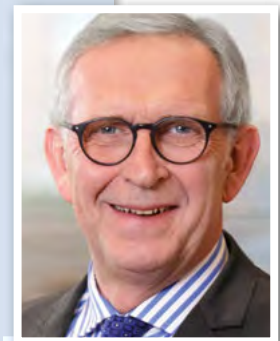
Dr. Dieter Salomon
Lord Mayor
City of Freiburg im Breisgau

The city's early focus on environmental sustainability, solar technology and life sciences has given it a decisive edge in international competitive environments. Today, some 12,000 people living in the City of Freiburg and the region are employed in the environmental and solar industries and the city ranks with the best in terms of economic growth, job creation and population growth.

Freiburg is a host city and organiser of international trade fairs and conferences, above all Intersolar, now running events on four continents, and the Freiburg Convention of International Laureates.

Apart from science and technology, politics and active citizens, other factors like culture, the city's climate and landscape, as well as its lifestyle and quality of life, round off the image of Freiburg as a "Green City" and attract creative minds, investors and tourists from around the world to it.

Dr. Bernd Dallmann
CEO Freiburg Wirtschaft Touristik und Messe GmbH & Co. KG
Chairman European Environmental Foundation





[Green Economy and Research]

Green markets create future prospects

It is not only the Club of Rome that predicts that “the markets of the future are green.” The renewable energy industry delivers technology and expertise for the rapid phase-out of nuclear power and for Germany’s alternative energy policy, often referred to as the “Energy Revolution”, which is emphatically driven forward in Germany – according to the Federal government, it will invest up to € 550 billion in this by 2050.

A feasibility study documents the fact that the path to “100% energy from renewables” can even contribute to regional value creation: according to this study, some € 3 billion in investment is needed for renewable energies and some € 12 billion for building renovation in the Freiburg region. Regional businesses, trades and

employees will benefit greatly from this. The associated ecological target thus serves as an economic stimulus programme – a win-win situation for both ecology and the economy.

THE ENVIRONMENT AS AN ECONOMIC FACTOR

Apart from medicine and healthcare, environmental economics and research play a key role in Freiburg: with 12,000 workers in 2,000 firms, this sector contributes around € 650 million to value creation and to the positive image of the region. In the solar industry alone, which employs over 2,000 people in 100 companies, employment is three to four times the national average, although intensified global competition and consolidation in the solar industry will influence its future development.

SCIENTIFIC EXPERTISE

Science centres, like the Fraunhofer Institute for Solar Energy Systems ISE, function as centres of gravity around which numerous spin-offs, service providers and organisations have clustered: from solar factories to energy agencies, consulting offices to solar architects, the zero-emission hotel to trade and craft enterprises. Agriculture and forestry also benefit from this scientific work, such as the Institute of Viticulture and Oenology, the Forestry Test and Research Institute or research on climate ecology, sustainable forestry and environmental medicine at the Albert Ludwigs University of Freiburg.

www.green-therm-cool-center.de
www.uni-freiburg.de
www.zee-uni-freiburg.de

ENERGY FROM THE SUN



With 1,100 employees, the Freiburg-based Fraunhofer ISE is the largest European solar research institute and is committed to a sustainable, economic, safe and socially fair energy supply system. The Institute develops materials, components, systems and methods for energy efficiency, generation, distribution and storage with the aim of delivering efficient and environmentally-friendly energy.

The Fraunhofer ISE’s fields of work cover virtually all areas related to alternative energy: from photovoltaic technologies to solar thermal, energy-efficient buildings, system and grid issues and storage technologies to zero-emission transport. The Fraunhofer ISE also has several test centres. The Institute is a member of the Fraunhofer Society, Europe’s largest organisation for applied research.

www.ise.fraunhofer.de



A strong network for innovative technologies

New value creation chains have become established and continue to be established in Freiburg, from basic research to technology transfer and global marketing.

Cluster | GREENCITY FREIBURG

The regional cluster initiative launched by the FWTM, the company responsible for promotion of business, tourism and trade fairs in Freiburg, has been linking up the 140 cross-sector cluster stakeholders from the solar and environmental industries since 2009. Its sphere of activity ranges from networking and communications and public relations work to location marketing and participation in trade fairs. The initiation of cooperative partnerships between cluster members, the use of synergies in joint projects and, not least, the safeguarding and creation of jobs for Freiburg and the region are an indication of the excellent networking of the companies. A key partner here is the "Wirtschaftsverband 100 Prozent Erneuerbare Energien – WEE100%" (100 Percent Renewable Energy business association).

www.greencity-cluster.de

JOINTLY PROMOTING AN ALTERNATIVE ENERGY STRATEGY

Apart from the cluster initiative, there are also other networks that promote the transfer of knowledge in the region and push forward its alternative energy strategy: It's not just the "WEE 100%" that is committed to the political goal of providing energy from renewable energy sources. The "Klimapartner Oberrhein" (Upper Rhine Climate Partners) actively promote climate protection and create an awareness and knowledge of energy-saving opportunities through information, networking and further education.

The Solar Info Center, a technology and service centre for renewable energies, pools a number of professional partners for energy-optimised design, construction and business and thus provides effective access to sustainable solutions, which are both ecologically and economically sound.

The Freiburg Environmental and Renewable Energy Business Network includes research institutions, like the Fraunhofer Institutes, the International Solar Energy Society (ISES), a global umbrella association, the Oeko-Institute and many international companies, as well as regional trade firms, suppliers and service providers.

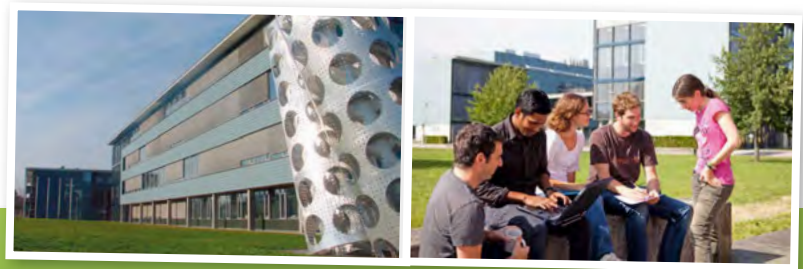
GREEN LIGHTHOUSES AND EXPERTISE

This network is the foundation for the development of innovative and green lighthouse projects. The Green City Tower – an approximately 48-metre high-rise residential and commercial block – has evolved into a lighthouse project, due to its size and environmental features. Its outstanding hallmark is an innovative energy plan, which Frey Architects, together with various partners, including the Fraunhofer ISE and Siemens AG, wish to realise. According to their vision, the building will generate much of its own power from solar energy, and what's more, store the excess in a large lithium-ion battery storage system – a first for a building complex of this size.



www.wee100prozent.de
www.klimaschutz-oberrhein.de
www.oeko.de

www.solar-info-center.de
www.ises.org
www.architekten-frey.de



[A sustainable university]



The University of Freiburg has welcomed students of all major disciplines since its foundation in 1457, and still offers undergraduate and post-graduate degree programmes all main fields: the arts, business, science, engineering, medicine, law and theology. This is an ideal environment for pioneering interdisciplinary courses.

More than 24,000 students from over 100 different nations are enrolled on 180 degree programmes at eleven different faculties. There are more than 7,000 committed professors and other members of teaching and non-teaching staff – they experience at first hand the family-friendly working conditions, equal opportunities and environmental protection.

4

SUSTAINABILITY IN RESEARCH

A number of University centres and faculties have a research focus in the field of sustainability sciences. The Freiburg Materials Research Centre (FMF) and the Freiburg Centre for Interactive Materials and Bioinspired Technologies (FIT) engage in interdisciplinary material science and energy research. Projects include the development of embedded microsystems without an external power supply. The Faculty of Forestry and Environmental Science was restructured in 2012 and now specialises in the sustainable use of natural resources.

A new Department for Sustainable Systems Engineering (INATECH) was founded at the Faculty of Engineering of the University of Freiburg in October 2015 together with the five Fraunhofer Institutes in Freiburg. INATECH will also be giving new impetus to teaching: the Master's degree course "Sustainable Systems Engineering" is scheduled to start in the winter semester 2016/17, followed by a Bachelor's degree one year later.

PROGRAMMES AT THE UNIVERSITY

TEACHING

- BSc Waldwirtschaft und Umwelt
- BSc Umweltnaturwissenschaften
- BSc Holz und Bioenergie
- BSc Sustainable Systems Engineering → planned
- BSc Embedded Systems Engineering
- MSc Sustainable Systems Engineering → planned
- MSc Embedded Systems Engineering
- MSc Sustainable Materials
- MSc Forstwissenschaften/ Forest Sciences
- MSc Umweltwissenschaften/ Environmental Sciences
- MSc Renewable Energy Engineering and Management
- MSc Environmental Governance
- MSc Geographie des Globalen Wandels

PROFESSIONAL DEVELOPMENT

- MSc (Online) Photovoltaics
- MSc Solar Energy Engineering

SUSTAINABILITY IN UNIVERSITY LIFE

The University of Freiburg stated its commitment to becoming a "Sustainable University" in a policy paper published back in 2003. The publication of the University's environmental policy in June 2007 laid the foundations for working towards the visionary goal of a carbon-neutral university. The environmental policy is designed to ensure the social responsibility of the University as an educational and research institution. Achievements in the area of environmental protection and "the sustainable university" are above and beyond statutory requirements.



The University of Freiburg has for years actively and successfully worked with selected external partners on a wide range of measures to improve energy efficiency and reduce energy use. Work includes:

- DezMon: The DezMon project, “local financial incentives for energy saving”, promotes energy saving by changing attitudes and offering financial incentives. The project successfully applied for funding from the Federal Ministry for the Environment, which allowed a climate protection manager to be appointed in 2010 to act as the central project manager for the twelve buildings in the DezMon project.
- The University of Freiburg has repeatedly been awarded the ÖKO-VERKEHRS-SIEGEL eco-transport seal (four times already), as it has and continues to offer incentives to encourage students and staff to come to university by public transport or by bicycle.

PARTNERSHIPS WITH THE LOCAL AUTHORITY

In their Innovation Charter (Innovationsscharta) launched in July 2011, the University of Freiburg, the City of Freiburg and the Freiburg Management and Marketing agency FWTM set out their objective: to work together to promote Freiburg as a centre of education, science, technology and business. The key areas of cooperation are Green City - Green Science: Sustainability, Science and Society; Research – Health – Life: Life Sciences and Healthcare; Science Now!: Dialogue between locals and business. Measures are implemented by a working group that does the preliminary work for other committees, organises regular meetings between the local authority and the University and informal meetings between the University executive and the leaders of the local council, etc. and implements their decisions. There are also two high-level meetings each year.

SUSTAINABILITY CENTER FREIBURG



The “Sustainability Center Freiburg” is a partnership between the five Freiburg Fraunhofer institutes and the University of Freiburg. Together with both small businesses and major companies such as Daimler AG and Robert Bosch GmbH, the Sustainability Center researches into and develops solutions for sustainability. Partners from society including the City of Freiburg im Breisgau ensure that the research findings are translated into everyday practice.

www.leistungszentrum-nachhaltigkeit.de

FREIBURG UNIVERSITY LIBRARY

Freiburg University Library reopened in its new, energy-efficient building in July 2015, and is now one of the largest and most modern university libraries in Europe. The University Library offers excellent service and the best possible environment for learning and working. The new building was designed by Degelo, a firm of architects in Basel, and has a transparent metal and glass façade – part of an innovative light, power and air conditioning concept.

www.ub.uni-freiburg.de



The environment as an economic factor: solar expertise and renewable energy sources



Freiburg has achieved some of its greatest successes, both in an economic and environmental sense, in the research and marketing of renewable energy. This is evident simply by glancing at the cityscape. Solar installations as far as the eye can see: on the football stadium, exhibition centre and city hall, on the roofs of schools, churches and private houses, on façades and towers and yes, even on the former landfill site. After all, with over 1,800 hours of sunshine per year, Freiburg is one of the sunniest cities in Germany, a factor that is not just conducive to tourism. There are also hydroelectric systems on the River Dreisam and wind turbines on the heights of the Black Forest, as well as other technologies, like biomass plants.

THE FREIBURG MIX

However, it is not just the favourable conditions provided by its geography and climate that have transformed Freiburg into the solar and environmental capital of Germany. It is also and above all factors such as the high level of environmental awareness among the population, political priorities and targeted promotion of business. Far earlier than elsewhere, people here recognised the opportunities presented by solar energy for climate protection, business and urban development. The much-visited and award-winning pioneering and model projects, like the world's first 'solar' house to be self-sufficient in terms of energy, the rotatable "Heliotrope" and the solar residential estate designed by the solar architect Rolf Disch, the passive houses in Vauban residential district, the world's first football stadium to have a solar system or the world's first passive high-rise building, are all testament to this approach.



RENEWABLE ENERGY FOR ALL

The regional energy and environmental service provider, badenova, has been driving forward an alternative energy strategy for many years. The medium-sized firm relies on a mix of measures in its strategy and regards itself as the "region's energy alliance".

badenova

Energie. Tag für Tag

Here are just a few examples: Regiostrom Fund, the regional alternative energy fund, promotes the expansion of renewable energy sources – since 1999, over 2,700 private solar systems, 37 hydropower plants and seven biomass systems have been supported. The fund is financed by customers who buy "regiostrom aktiv" power, electricity from renewable sources. badenova supplies all residential customers with green electricity as a matter of course. The company also uses its Innovation Fund for Climate and Water Protection to support pilot projects that could otherwise not be realised due to a lack of profitability. Since its inception, 3% of the company's profit (around € 1.8 million) flows annually into this fund. badenova invests in the expansion of solar energy, wind energy and the biogas sector – because there can be no alternative energy strategy without a broad-based energy mix.

www.badenova.de

Since 1986 the City of Freiburg has been supporting the expansion of renewable energies with targeted project funding, roof space for solar systems and information campaigns on issues such as climate protection and energy efficiency.

In addition, partners from the world of business and science work together to produce technical innovations, qualified growth and a future-centric region.

[Climate Protection and Energy Supply]



On route to a carbon-neutral community

CLIMATE PROTECTION AND ENERGY SUPPLY

Climate protection requires international and national agreements and targets, although cities and regions can act as pioneers. Freiburg was getting to grips with climate protection at a time when the issue had not yet reached the political and business agenda, and is now regarded, far beyond the borders of Europe, as a trailblazing climate city.



LOCAL ALTERNATIVE ENERGY STRATEGY AND CLIMATE PROTECTION PLANS

As far back as 1986, and directly after the accident at the Chernobyl reactor, Freiburg Municipal Council resolved to phase out nuclear energy and, in the same year, adopted a future-centric energy supply strategy, based on the three pillars of energy-saving, energy-efficiency and renewable energy sources. In 1996 the Municipal Council resolved to achieve a 25% reduction in CO₂ emissions by the year 2010. The local authority built on these climate protection goals in 2007 and 2014. The current target is to reduce CO₂ emissions by at least 50 % by 2030, and the long-term goal is to achieve climate neutrality by the year 2050. Freiburg has successfully completed the first stage and already achieved more than half of the planned

reductions. A package of measures led to per-capita reductions in CO₂ emissions of nearly 30 % compared to 1992, and an absolute reduction of 20.7 %. Nuclear power as a percentage of total power was also reduced from 60 to less than five %. Since 2011, green electricity has been the standard power offered to retail customers, and over 50 % of the city's electricity demand is met by combined heat and power.

CLIMATE-NEUTRAL CITY BY 2050 AND 100% RENEWABLE ENERGY REGION

Both the "Freiburg 2050 - En route to becoming a climate-neutral city" study, published by the Oeko-Institute, and the feasibility study by the Green City Cluster and the Freiburg Regional Energy Agency show that a region powered by 100% renewable energy can be achieved by 2050.

The prerequisites for this include halving energy consumption, increasing energy efficiency in the private and commercial sector, and an exclusive use of renewable energy. The target is ambitious – an energy revolution in its truest sense. The City of Freiburg can achieve the target of climate-neutrality locally, with energy efficiency playing a key role, however the target of 100% power from renewables can only be achieved by working together with the surrounding districts. At the same time this demands a fundamental shift in climate policy frameworks, at state, federal and EU levels, to support an energy revolution on this scale.

TARGETED INVESTMENT

To be worthy of the name, a local climate protection policy should not just be restricted to declarations of intent, but requires everyday practical, political and financial consequences. 10% of the concession levies, paid by badenova, the regional energy provider, to Freiburg City Council for pipeline rights for electricity and water, have been employed directly for climate protection projects since 2008. To achieve its goal of climate neutrality, Freiburg Municipal Council resolved in 2014 to more than double this investment to 25%: since 2015 a number of additional energy projects have been funded by around € three million per annum.



Climate protection in detail



To reach climate neutrality objective, the local authority will, however, have to do more than simply set an example. It will have to seek partnerships with as many other players as possible including businesses, energy providers, private households, educational institutions and the research sector. Freiburg is therefore currently investing in campaigns promoting a sustainable lifestyle, and in local district energy efficiency projects.

PROJECTS PROMOTING A SUSTAINABLE LIFESTYLE

People's everyday habits have an ecological impact, but also offer each individual many opportunities to reduce CO₂ emissions. Freiburg runs a number of information and participatory projects. Local residents can find out more about their individual carbon footprint and practical climate protection options from the "Freiburg CO₂-Diät" initiative. The recent projects "200 Familien aktiv fürs Klima" ("200 families for climate protection") and "Klima Klub" ("The Climate Club") have given all those interested the chance to test climate-friendly alternatives to their usual lifestyle and consumer habits. The City of Freiburg won an award in the "Kommunaler Klimaschutz 2013" municipal climate protection competition for this participative campaign. This is an incentive to local residents to continue to explore options for a climate-aware lifestyle in the future.

CONSUMPTION OF REGIONAL PRODUCE IN FREIBURG

Our current food consumption has a significant impact on the climate, on biodiversity, on the quality of water and soil and on animal welfare, both locally and in remote regions of the world. That is why our eating habits are an important element of local sustainability policy. Freiburg is a member of the "Bio-Städte" ("organic towns") network and has taken on a leading role in promoting a regional and ecological food supply. Regional products are very popular, but just how great a proportion of total consumption

in Freiburg are they? This was investigated in the first study of its kind, commissioned by the City of Freiburg. New projects drawing on existing strengths have now been launched where the study found potential for improvement. Partnerships between the city and regional authorities, the Freiburg AgriKultur agricultural festival, organic and regional produce in school and nursery canteens, a Kantinenkongress ("canteen conference") for bulk consumers in the catering business, joint campaigns with producers, retailers and the catering trade, and intercultural exchange with the "Manger Local" project in Besançon are all promoting quality regional production with consumers, and improving the quality of life in the region.

FOCAL POINTS OF THE CITY'S URBAN CLIMATE PROTECTION POLICY



Our focus continues to be on energy-saving, energy-efficiency and renewable energy sources. We also focus on cooperation with industry, commerce and retail, alongside implementing specific urban projects and reaching out to the people of the city with targeted public relations work and funding programmes. The City of Freiburg has been offering the

ECOfit programme to companies since 2010: as part of the programme, participants receive training in environmental management issues in workshops and on-site visits. The "Energy-efficient Renovation" incentive programme, which makes available an annual grant of € 450,000, has also proved its worth.

The expansion of combined heat and power is also making a significant contribution to reaching Freiburg's climate protection target of a reduction of 50% by 2030. To this end, the City of Freiburg launched the "Wiehre Power Plant – local electricity and heat" district project. The district projects "Energiequartier Haslach und Kappel" focused on heat insulation as well as energy supply. In partnership with many other organisations operating locally, the projects ran tailored information events in the various districts. The project "Zuhause A+++ " provides energy advice for local residents free of charge. It started in Haslach, and has now been rolled out for the entire city.

Gerda Stuchlik

Deputy Mayor, Department of the Environment, Schools, Education and Facility Management

www.freiburg.de/umwelt



CLIMATE PROTECTION AS A FACTOR IN DISTRICT PLANNING

The energy-related requirements for the new districts of Rieselfeld and Vauban were stipulated as far back as 1992. The “Freiburg Energy-efficient Housing Standard” for new buildings, introduced thereafter, has exceeded the specifications of the national Energy-saving Ordinance (EnEV) for many years. A basic procedure for “climate protection in land use planning” was developed to transfer the experience gained to new districts: “Solar optimisation of the development plan”, “Study of energy supply alternatives” and “Compliance with Freiburg building standards”.

CLIMATE PROTECTION IN EXISTING BUILDING STOCK

However, the path to becoming a climate-neutral city involves the energy-saving renovation of existing building stock as well as energy-saving measures in new buildings. Freiburg offers a number of district projects and funding incentives for private households, as well for commerce and industry. It is these kinds of projects particularly that need the acceptance of local people. The emphasis here is therefore, above all, on communication and consultation, as well as the involvement of all stakeholders, right from the project development stage.

WIEHRE POWER PLANT: LOCAL ELECTRICITY AND HEAT

The pilot project “Kraftwerk Wiehre” was originally launched as a targeted local campaign in conjunction with a city combined heat and power plant funding programme, and was designed to highlight excellent climate protection solutions in established urban structures. The aim was to promote the use of CHP plants in Freiburg by overcoming the reservations of home and flat owners through information, advice and initial financial assistance, and to explore and establish the many possible uses of CHP.

Alongside city-wide advisory services for house owners and associations of flat owners, and free local surveys, the project also covered the development of individual solutions and financial support for CHP plans and the implementation of CHP plant pilot projects.

www.freiburg.de/kraftwerkwiehre

HASLACH & KAPPEL “ENERGY” DISTRICTS

In its district plan for Kappel and Haslach, the local authority explored what specific measures could be taken in these two areas to reduce local CO₂ emissions. The involvement of local residents was key to the success of the energy plans. The focus was on the renovation of buildings and heating plants, and on exploring the options for local heating. Part of the plan was to develop renovation guidelines for buildings in Haslach and Kappel. Kappel and Haslach residents worked with specialists to come up with appropriate measure in public consultations on these issues.

www.freiburg.de/energiequartier-haslach
www.freiburg.de/energiekappel

“ENERGY-AWARE RENOVATION” FUNDING PROGRAMME

Since 2002, the City of Freiburg has been running the “energiebewusst sanieren” energy-aware renovation scheme, which focuses on the renovation of the building envelope. A simple structure, clear communication and low administrative costs are the key factors that have made the Freiburg scheme a success. That success is reflected in the following figures:

- 14 years of funding
- € 3.9 million in grants
- € 39 million of investment in energy-saving measures
- 70.000 t CO₂ saved since 2002

By the end of 2015, there had been 2,639 applications, including 988 for heat insulation work. Since the extension of the funding programme after April 2015, applications for more than the projected € 0.35 million have been received. High levels of renovation in Freiburg are testimony to the scheme’s success: the figure was 1.6 % for the years 2009-2012. To reach Freiburg’s climate protection target, however, this level must rise further to 1.8 % by 2020 and to 2 % thereafter. An important driver in this development will be the continuation of the city funding and advisory programmes.

WEINGARTEN-WEST: FIRST PASSIVE HIGH-RISE BUILDING IN GERMANY

To kick off the energy-efficient renovation of the “Weingarten-West” district, the 16-storey high-rise building at Bugginger Straße 50, which dates back to the 1960s, was converted into Germany’s first passive high-rise building at a cost of around € 13.4 million, with two more to follow. In addition to energy-efficiency measures, the municipal building company, Freiburger Stadtbau, was also primarily concerned with social aspects, such as relocation management, tenant needs, security through price-controlled apartments as well as accessibility and social facilities.

[Green Industry Park Freiburg]



The move towards renewable energy brings economic advantages for business. One important aspect of the shift is bringing together all key players and all necessary components to enable the smart management of energy generation, storage and use.

Climate protection and energy efficiency in Industriegebiet Nord

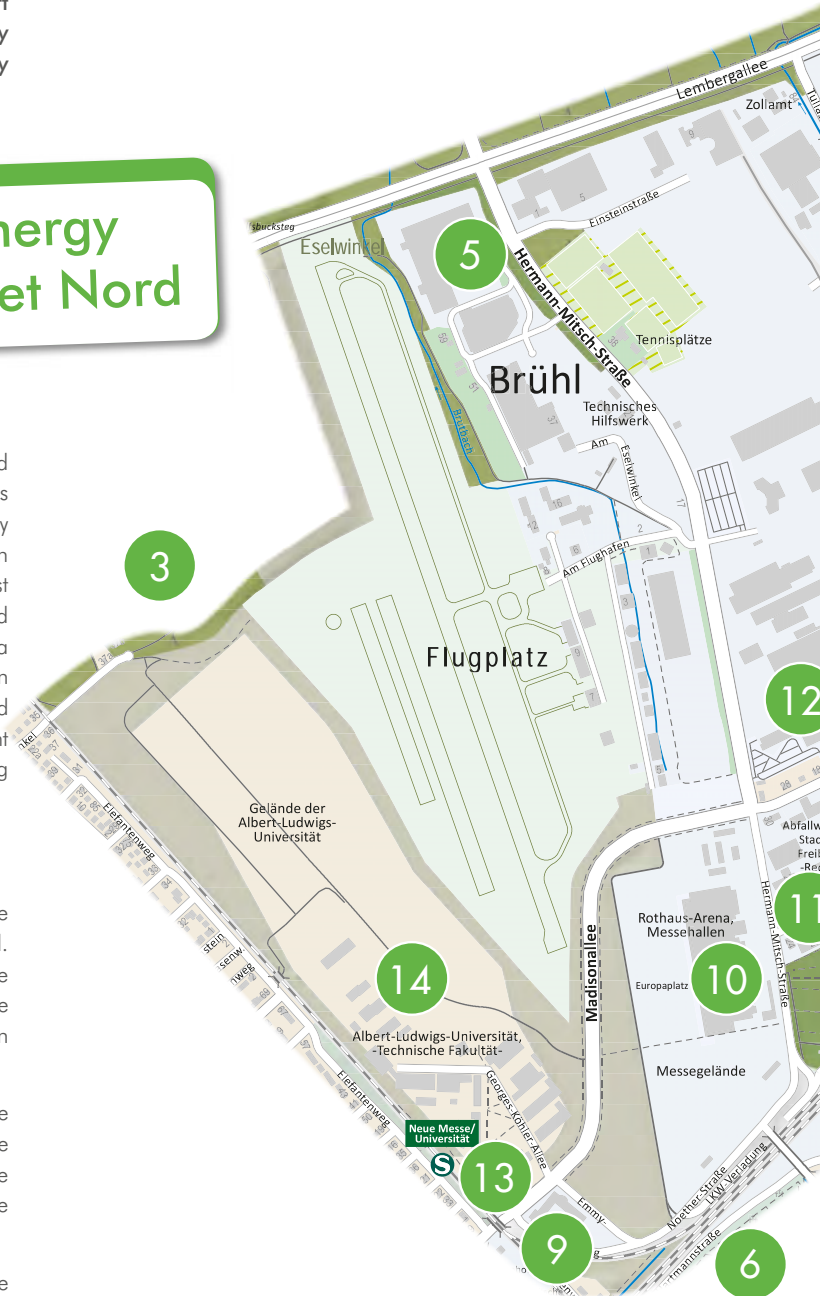
That is why the City of Freiburg, badenova, Fraunhofer ISE and Freiburg Management and Marketing FWTM have set a new focus as part of the "Green City Freiburg" concept. Launched in February 2014, the "Green Industry Park Freiburg" initiative is to work with the local businesses to transform Freiburg's largest and oldest industrial estate into a pioneering, sustainable, energy-efficient and resource-efficient business park and a model for the country as a whole; to turn the estate into a brand with which the businesses can identify. The initiative is about bringing together committed businesses and individual company solutions, the joint development of new, innovative projects and pilots, and highlighting and harnessing potential for savings and collaboration.

CLIMATE PROTECTION CONCEPT

In consultation with the companies based on the site, possible partnerships and individual potential for savings were first identified. Specific measures were then developed on this basis and these are currently being implemented. The findings and measures have been set out in the country's first climate protection concept for an industrial estate.

The concept has received 50 % of its funding from the national climate protection initiative (Nationale Klimaschutzinitiative) run by the German Federal Environment Ministry, and the other 50 % from the local council environment office. Once again, Freiburg is leading the way nationally.

The first step towards a green industrial estate and the climate protection concept was to survey the businesses on site and run a series of workshops to get an overview of energy systems and consumption: how much was used where, where the power was produced and where waste heat was generated. The next step was to examine whether these systems could be optimised. For example, could the waste heat from one business be used to heat a building for the neighbouring company?



FACTS & FIGURES

- 300 ha
- 300 businesses
- 20% of total electricity consumption in Freiburg
- 10% of Freiburg's CO₂ emissions



ACTION PLAN

An action plan was drawn up on the basis of the data collected. The action plan clearly shows what measures can be taken where and in what order. These include analysing the existing energy infrastructure, developing appropriate climate protection mechanisms, and linking up existing and driving forward new, innovative projects. The aim is to allow companies to benefit from steady or falling operating costs and improve their competitiveness.

Nearly 70 measures for climate protection were put together on the basis of the energy map for Industriegebiet Freiburg-Nord industrial estate, the analysis of renewable energy potential and the two workshops with businesses on the estate.

These cover four main action areas:

- Mobility and transport
- Energy efficiency and energy management
- Development of renewable energy
- Public relations and networking

www.greenindustry-park-freiburg.de

PILOT PROJECTS

Certain businesses are already doing a great deal to promote energy efficiency and climate protection, as the outline below shows.

- | | |
|--|--|
| <p>1 Solar power plant, micro gas plant Eichelbuck
ASF Solar/badenova AG & Co. KG</p> <p>2 Biogas plant
RETERRA Freiburg GmbH</p> <p>3 CHP for heat supply of Landwasser
badenova AG</p> <p>4 Wood pellet steamer & Energie Management System
Pfizer Manufacturing Deutschland GmbH</p> <p>5 E-Mobility
IKEA Deutschland GmbH & Co. KG</p> <p>6 Hydrogen station
Fraunhofer ISE</p> <p>7 Smart2Grid (CHPs)
Fraunhofer ISE</p> <p>8 Elektrolyseur – Power to Gas
Fraunhofer ISE</p> | <p>9 Technology and Competence Centre for Renewable Energy
Solar Info Center</p> <p>10 Solar power plant Messe Freiburg
FWTM GmbH & Co. KG</p> <p>11 Solar power plant St. Gabriel
ASF Solar</p> <p>12 Gas and steam turbine plant
Wärmeverbundkraftwerk Freiburg GmbH</p> <p>13 Power generation out of waste water (planned)
IMTEK/Solvay Acetow GmbH</p> <p>14 Expansion „Technische Fakultät“ (planned)
Albert-Ludwigs-Universität Freiburg</p> <p>15 CHP
Micronas GmbH</p> |
|--|--|

A joint initiative by

badenova
Energie. Tag für Tag

Fraunhofer
ISE

Management
Marketing
FWTM
FREIBURG

Freiburg
IM BREISGAU



[Sustainable Urban Development]

Planning with foresight and civic involvement



FREIBURG LONG-TERM PLAN

Freiburg is a growing city where more and more people want to live. The “Perspektivplan Freiburg” road map highlights options for sustainable urban development in Freiburg over the next 10-15 years. The aim is to develop a policy for the cityscape and urban spaces of the future. The “Perspektivplan” develops ideas and strategies for making better use of space in the future. It indicates how densely you should build within the existing city boundaries and how much space is needed, and highlights the key areas on which future development should focus. The Perspektivplan is an informal framework, and provides a basis on which to extend the 2020 land development plan.

NEW DISTRICT

Freiburg has great momentum for growth as an attractive place to live and work. However, the city also faces new challenges with this positive growth. Demand for affordable homes is high. Above and beyond development within existing built-up areas, Freiburg therefore also requires a new district with at least 5,000 flats (to house around 11,500 people). A detailed development project identified Dietenbach, an area of around 100 ha in the west of Freiburg, as a suitable place for development. The district has excellent potential, with good transport links and an existing infrastructure, and is close to recreational areas. In the light of the large number of property owners, the area is to be developed on the basis of an official urban development scheme (städtebauliche Entwicklungsmaßnahme) in accordance with the German Federal Building Code. The required “development regulations” (Entwicklungssatzung), the tendering process and planning processes are currently being prepared. The procedure as a whole is being coordinated by the urban development task force set up in 2013, “Projektgruppe Dietenbach”. Freiburg is again raising the benchmark in terms of sustainable urban development with the much-publicised construction of the districts of Vauban and Rieselfeld, taking into account social aspects, the city’s goal to achieve climate neutrality and high-quality open space design.

URBAN CLIMATE PLAN

Maintaining a healthy and balanced urban climate is becoming an increasingly important task in times of climate change. This applies especially to the burgeoning City of Freiburg. For the next stage in urban development, it is important to know which spaces are particularly sensitive and at risk in terms of the urban climate, which spaces could help to restore a good urban climate, and what changes are required.

INNOVATIVE ENERGY PLAN

Energy-saving and “solar optimisation” principles are incorporated in designs and plans at an early stage in Freiburg, in the orientation and positioning of buildings, for example, or by the application of the mandatory Freiburg “Energy-efficient Housing Standard”. Energy plans are produced for all building areas and the most environmentally-friendly type of energy supply is contractually prescribed, providing that this can be achieved at an identical or relatively minimal (maximum of 10%) additional cost.

CIVIC PARTICIPATION

The City of Freiburg has offered a wide range of formal and informal opportunities for local involvement for many years. This applies to statutory construction and planning procedures, for example in the production of land use and development plans, and to informal concepts. The local authority employs various different participatory procedures and targeted public consultation in the development of integrated urban and district development plans, district policies and frameworks, and in urban regeneration and a wide range of construction projects. Public consultation is now an integral aspect of projects. That is why the local authority is currently drawing up public consultation guidelines for construction and planning to provide a clearer structure and system for public consultation processes, and to continue to ensure quality criteria for effective public consultation are fulfilled.



Modern local planning and district development

RIESELFELD

ECO-HOUSING IN THE STATE'S LARGEST DISTRICT PROJECT

The largest district project in the federal state of Baden-Württemberg covers an area of some 70 hectares, and now provides 3,700 homes for 10,500 people – built by more than 120 private builders and investors. Its positive image, comprehensive and needs-based public infrastructure and intact neighbourhood life, make Rieselfeld an attractive location for owners and tenants. The emphasis is on civic engagement and active cooperation in the district. The district borders a 250-hectare nature reserve that the people of Rieselfeld use as a local recreational area.

All houses have been built as low-energy buildings. Photovoltaics and solar thermal systems harness the energy from the sun in many homes. Further renewable energy use and district heating from combined heat and power plants, a systematic water supply plan and consideration of climatic aspects, attest to the fundamentally forward-looking approach of this very new district. The urban development plan also attaches great importance to green spaces, play areas and open spaces, as well as cycle paths and pedestrianised streets.

www.freiburg.de/rieselfeld



VAUBAN DISTRICT

URBAN DEVELOPMENT WITH ECO-AWARENESS

The inner-city “Vauban” district was built on the grounds of the former barracks belonging to the French armed forces and covers an area of some 40 hectares. An attractive, family-friendly district, now home to some 5,500 inhabitants, in which civic involvement goes hand in hand with collective building and environmentally-conscious living. Low-energy building is mandatory in this district and around 170 units have been built as ‘passive’ houses and a further 70 as energy-plus homes. Heating from a local heating network powered by renewable energy sources and the use of solar technology is largely standard for most homes.

The former stock of trees has been largely preserved. Green spaces between the rows of houses guarantee good climatic conditions and provide play areas for children. An infrastructure incorporating schools, nursery schools, youth facilities, civic meeting places, a market place as well as leisure and play areas, was built in parallel with the private development. Vegetation-covered ‘green’ roofs store rain water, which is collected and re-used in the district.

The residential area is largely traffic-calmed, with whole streets free of parking spaces, many households not even owning a car, and private vehicles being parked in one of the two car parks in the district. The district has been connected to the city’s tram system since 2006, enabling many people to do without a car, preferring to use local transport or ride their bikes.

Large information screens in German, English and French in Paula-Modersohn-Platz and Alfred-Döblin-Platz and at the Innsbrucker Straße stop highlight what to look out for in Vauban and tell the history of the district. The information can also be accessed in other languages online using the QR code.

www.freiburg.de/vauban



[Sustainable Mobility]

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Freiburg Transport Plans

As far back as 1969, the City of Freiburg adopted its first “General Urban Transport Policy” and since then it has been one of the declared aims of the city’s urban transport policy to ensure a good level of mobility that does not adversely affect urban development, nature and the environment. Freiburg’s transport policy, which has attracted attention nationwide, promotes environmentally-friendly modes of travel (walking and cycling, local public transport). The city was rewarded for its efforts in 1995 with the award of the “European Local Public Transport Prize”.

SUCCESSES OF FREIBURG’S TRANSPORT POLICY

Between 1982 and 1999 the percentage of bikes in the total volume of inner-city traffic rose from 15% to 27% and public transport rose from 11% to 18%, while the percentage of trips made by car fell from 38% to 32%. Compared with other major German cities, Freiburg has an extremely low density of cars, with only 393 cars per 1,000 residents.

PREVENTATIVE TRAFFIC AVOIDANCE

The primary aim of Freiburg’s transport policy is the prevention of traffic by the creation of a compact city that people can cross quickly, with strong neighbourhood centres, urban development along the main public transport arteries and priority for inner-city development rather than suburban growth.

The major urban development decisions adhere to the concept of preventative traffic avoidance: from the construction of the new urban districts of Vauban and Rieselfeld, both of which have excellent connections to the tram system, to the expansion of city-centre university sites and the markets and centres plan, which gives preference to basic provision in the neighbourhood ahead of supermarkets on greenfield sites.



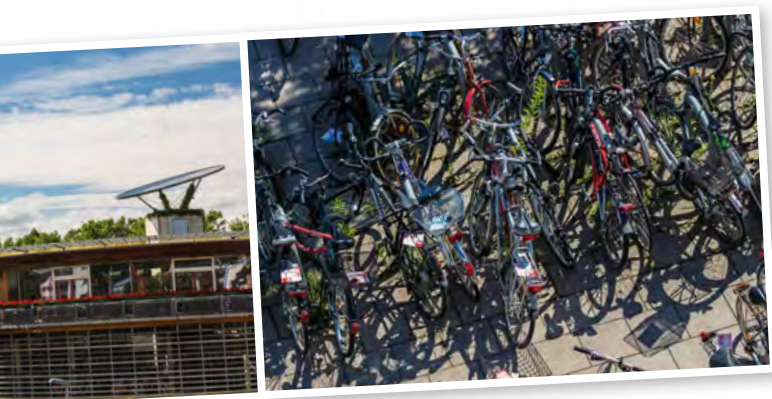


ENVIRONMENTALLY-SOUND TRANSPORTATION

The strategy of traffic avoidance is enhanced by the reinforcement of urban and environmentally-friendly transport systems: walking, cycling and local public transport have benefited for over three decades from the expansion of the relevant infrastructure. Today bikes are just as much part of the cityscape, as are bicycle taxis for tourists.

PARKING MANAGEMENT AND FURTHER DEVELOPMENT OF THE ROAD NETWORK

The city-friendly management of car traffic is the third objective of Freiburg's transport policy. There is now a complete parking management system in place in many parts of the city. A system of financial incentives and fees, car parks and parking guidance systems reduces the pressure caused by vehicles and cars looking for parking in inner-city residential areas. A good car-sharing network is reducing the number of private vehicles on the roads. The local authority is promoting this development with a city-wide plan for around 70 car-sharing points in the public road network, and the figure is set to rise. Controlled development of the road network is underway to deal with existing bottlenecks, and to move traffic that cannot be reduced away from residential areas.



BUILDING BLOCKS IN THE CITY'S TRANSPORT POLICY

Since the city built its first pedestrian zone in 1973, Freiburg's transport policy has been dominated by the unspectacular but steady development of coordinated building blocks.

- With new lines, scheduling frequency and passenger comfort, the old tram system evolved into a modern city railway system that today serves almost all the major districts of Freiburg. Around 70% of all residents live near a stop.
- The Breisgau S-Bahn regional rail line, conceived in collaboration with the neighbouring districts, provides fast and affordable links between the city and region and links regional transport to long-distance transport at the central train station.
- In 1970, there were hardly any cycle paths. Today there is a dense network of cycle paths, extending to some 420 km in length, which is continually being expanded and also includes especially attractive routes where cycling take precedence. Bike parking, signposting and a cycling map, alongside marketing activities aimed at cyclists, underpin this approach.
- Large parts of the city have been designated as pedestrian zones and completely redesigned. This upgrading work in urban areas will continue over the next few years.
- Pedestrians and cyclists also benefit from comprehensive traffic-calming measures in residential areas: 90% of Freiburg's residents now live on roads that have a speed limit of 30 km/h or lower.

www.vag-freiburg.de
www.breisgau-s-bahn.de
www.rvf.de
www.freiburg.de/verkehr



[Nature, the City's Resource]

Green lungs: Freiburg's forest



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Freiburg is one of the greenest cities in Germany: no other city of a comparable size can offer a larger area of woodland and vineyards and such diversity of habitats and natural spaces. Freiburg literally lies in the greenbelt and this factor plays a key role in its appeal. Its location, sunny climate, its relaxed pace of life caused 19th century visitors to the city to talk of the "Front hall of Italy" and the "First exhilaration of the South".

The City of Freiburg is one of the largest municipal forest-owners in Germany. Covering an area of some 6,400 hectares, 43% of the urban district of Freiburg is made up of woodland – it functions as the lungs and the green heart of Freiburg and, with around four million visitors a year, it is the most important recreational space close to the city. The nearby Black Forest, with its rich and bountiful natural environment, plays a crucial role in the appeal of Freiburg to tourists: 90% conservation area, 15% natural habitat. The Black Forest also has an outstanding infrastructure with 450 kilometres of forest paths, adventure and educational trails, BBQ and play areas, observation towers, bathing lakes etc.

RECREATIONAL SPACE, FORESTRY AND ECOSYSTEM

It is not simply a coincidence that the much-quoted term "sustainability" originally comes from the world of forestry. Forests are habitats for animals and plants, recreational space for people and indispensable for climate protection, as they produce wood, a renewable raw material, and also store groundwater.

After the seas and oceans, woodland is the most important CO₂ sink and thus of crucial importance for climate protection. That is why Freiburg has long been committed to sustainable forest management. In 1999, the Forestry Office was the first forestry operation in Baden-Württemberg to be certified under the Forest

Stewardship Council (FSC), which allows it to market timber displaying the eco-label. This approach therefore means that high standards apply to the management of the city's woodland, such as refraining from deforestation, pesticides and insecticides.

The "Freiburg Forest Convention", was adopted in 2001, the first of its kind at a municipal level, and revised in 2010. This commits the City to a policy of ecological, economic and social responsibility with regard to sustainable forest management. Freiburg has also supported the Freiburg Convention on the Protection of Ancient Woodland, developed by Greenpeace Freiburg, since 2009. One of the aims is to do more to promote the sale of local timber, preferably certified under FSC or Naturland guidelines.

In times of rising timber prices, the municipal forest is also starting to grow in economic importance: currently, the felling of 35,000 square metres of woodland raises € 2 million in revenue for the city annually. The woodland ecosystem can only be maintained providing economic and ecological management go hand in hand. If the timber from the Mooswald Forest is used to build nursery schools and apartment blocks, then this benefits resources, the city's budget and jobs in the region.

LEARNING FROM NATURE

The Municipal Forestry Office in Freiburg is responsible for the Mundenhof Animal Reserve, supports private and public nature and environmental education facilities and organises its own woodland educational events. The Forestry Testing and Research Institute or the Faculty of Forestry and Environmental Science enjoy an excellent global reputation in matters of forest and climate ecology.

www.freiburg.de/forstamt
www.freiburg.de/mundenhof



The green, green grass of home: Green spaces and nature conservation areas

Freiburg's many green spaces are a major factor in its reputation as a green city that offers an exceptional quality of life – indeed the city lies in a natural green space designed by Mother Nature: 660 hectares of green space extend from its outskirts right into the heart of the city. There is a massive expanse of green space between Tuniberg in the west and the meadows bordering the River Dreisam in the east: landscaped and nature conservation areas, parks, like the Seepark or the Möselepark, allotments, children's playgrounds and cemeteries.

DESIGN ELEMENTS, RECREATION AND PLAY AREAS

For over 20 years, the city has been maintaining its green spaces along natural and ecological principles. The use of pesticides has long since been abandoned. Grass is now mown only twice a year, compared with twelve times a year previously, which has significantly benefited the diversity of species in the grassland areas. 50,000 trees line the streets and punctuate the parklands, improving the microclimate in the city. 4,000 allotments help many families not just to enrich their diet and enjoy havens of retreat, but also create a close relationship with nature. The current 150 public play parks in Freiburg are more important than ever as leisure and recreation spaces, and contribute to a healthy living environment with their wide range of activities. Children and other local residents are consulted on new developments and regeneration projects, and can contribute their wishes and suggestions and help shape the final design.

CONCEPT FOR THE MANAGEMENT OF COMMUNITY GARDENING

Gardening in Freiburg is becoming increasingly varied. The classic system of garden plots is being supplemented by new types of gardens, and these enjoy the full support of large groups of the population. Producing their own food close to where they live, to have their own space which they can design and use in accordance with their individual needs and tastes, the social togetherness, as well as the contact with nature in urban areas are things that ever increasing numbers of people feel they need in their lives. It is for this reason that a concept for the management of community gardens has

been in development since 2016. This concept will aim to take the differing facets into account, and create a range of new forms, as well as alternative spaces to garden.

CONSERVATION AREAS AND BIOTOPES

6,996 hectares, 46% of Freiburg's land area, are made up of landscaped conservation areas and 683 hectares represent designated nature conservation areas. 3,623 hectares also have protected status under the European Natura 2000 network of protected nature conservation areas. Freiburg also has over 200 ha of protected biotopes outside protected areas, and almost 100 natural monuments. Freiburg offers a wide diversity of different natural spaces and biotopes within a relatively small area: from mountain meadows and woodland on the Schauinsland mountain, with their rare species of fauna and flora, such as capercaillie and arnica, to the Mooswald Forest and the warm and dry habitats of the Tuniberg colonised by a wealth of Mediterranean species, such as the emerald lizard. The City Council gives top priority to the designation and implementation of a Municipal Species Protection Plan. The ongoing implementation of integrated biotope concepts is combating the isolation and fragmentation of habitats.

The Schauinsland area of Freiburg is part of Naturpark Südschwarzwald southern Black Forest nature park (which has a total area of 370,000 ha, making it the second-largest in Germany), and Kappler Täler and Schauinsland are part of the Black Forest biosphere (Biosphärengebiet Schwarzwald). As a member of the Southern Black Forest Nature Reserve Association e.V., the City of Freiburg supports the aim of continuing the development of the Southern Black Forest in terms of nature conservation, tourism, agriculture and forestry and urban planning.

Thanks to its precautionary policy of maintaining protected areas, the City of Freiburg has done much towards creating new recreation and adventure spaces for people and, at the same time, safeguarding the natural heritage for future generations – an aim further assisted by Freiburg's accession to the "Climate, Community and Biodiversity Alliance".

www.freiburg.de/naturschutz
<http://udo.lubw.baden-wuerttemberg.de/public/>
www.naturpark-suedschwarzwald.de



CLEAN AIR PLAN HERALDS IN “FREIBURG AS AN ENVIRONMENTAL ZONE”

In the 1990s Freiburg recorded emissions and, for the first time, produced an air quality plan at a municipal level. Freiburg was the first German city to set up an ozone hotline. However, in spite of considerable efforts in relation to its transport and environmental policies, the air in Freiburg continues to be polluted by fine dust, exhaust fumes and ozone, which is why the Freiburg Regional Administrative Authority, the *Regierungspräsidium*, drafted the “Freiburg Clean Air Plan” in March 2006 in line with EU and Federal Government directives. Alongside traffic management measures, such as the construction of a tunnel under the city and further improvements to local public transport, the Action Plan added in 2009 also provides for the creation of a legally enforceable “environmental zone” in the city centre from 1 January 2010. Pollutant class 3 vehicles carrying a yellow sticker were still permitted to enter this zone until 2013. Now the “environmental zone” can only be entered by Pollutant class 4 “low-emission” vehicles carrying a green sticker. The extent to which the B 31, the main artery for through-traffic in the city and excluded from the environmental zone to date, will be included in this zone, will be decided in the course of updating the Clean Air Plan.

CLEAR CONDITIONS: SOIL CONSERVATION

The 2004 soil condition report for the Freiburg region (*Bodenzustandsbericht Region Freiburg*) documents soil contamination and current levels of soil pollution, and addresses the risk to the soil from acidification, erosion and land use. It provides an overview of areas with high levels of contamination, and recommends precautionary procedures and suitable protective measures to implement for sensitive and contaminated areas.

The report analysed more than 1,800 data sets. It is a source of information and the planning guidelines for land owners, users, planners and the relevant authorities. The aim is to protect the soil in the long term and to avoid the risks and hazards posed by soil contamination.

GO WITH THE FLOW: WATER CONSERVATION

Increasing land use, the sealing of soil with hard, impervious surfaces and the increased risk of severe weather caused by climate change all combine to make water conservation and flood protection more of a priority. In 2014, the areas at risk of flooding were shown on flood risk maps.

DESIGNING WATERCOURSES AS NATURALLY AS POSSIBLE

Another issue growing in importance is the design of watercourses to be as natural as possible and, in the process, the correction of ecologically unsound developments, such as the straightening of watercourses. This process, known as renaturalisation, can include the removal of riverbank armouring and embankments as well as the widening of riverbeds to create zones of flat water. Measures have already been taken to counteract this risk in a section of the River Dreisam at the Kartauswiesen meadows where a new, natural habitat for plants and animals has been created.

PREMIUM QUALITY WATER

Groundwater is our most important source of drinking water and needs to be protected from pollutants. As rainwater seeps through green spaces, these areas filter out pollutants, encouraging the creation of new groundwater and draining away surface water. Unnecessary drainage of rainwater can be prevented by the integration of water-permeable surfaces and “green” roofs into the construction plans for new areas of building.

TRADITIONAL WASTE WATER MANAGEMENT

The very first sewers were the “*Baechle*”, running down the sides of streets, which have been the pride of the city since the Middle Ages. Today, Freiburg has a modern waste water disposal system: wherever possible precipitation is to be retained and reused or allowed to seep into the groundwater where it falls. A charging system that distinguishes between what is known as “grey water” and rainwater, offers incentives to the people of Freiburg to use resources sparingly, with the result that Freiburg’s water charges are much lower than the national average.

[The Waste Management Concept]

Waste not, want not

IMPRESSIVE RECYCLING RATES

“Z’ Fryburg in de Stadt / sufer isch’s un glatt” – “In Freiburg city, it’s clean and pretty”, the lyrical outpouring of Johann Peter Hebel some 200 years ago. The people of Freiburg show great commitment when it comes to the separation of waste and their 90 kg of non-recyclable household waste per capita, well below the national average of 122 kg, is testament to this. Overall 69% of total waste is recycled in Freiburg. This recycling rate is made possible by the provision of a high-grade, differentiated collection system – and particularly thanks to the early city-wide introduction of the compostable waste bin.

WASTE MANAGEMENT PLAN AND EDUCATING PEOPLE ABOUT WASTE

The City has managed the growing volume of waste with a comprehensive waste management plan for the last 25 years. Its slogan “Avoid, Recycle, then Dispose” is intended to demonstrate ways of moving from being a “throwaway” society to one that practises sustainable consumer behaviour. This concept not only describes the evolution of waste management in Freiburg, but also includes a number of specific measures, for instance relating to educating people about waste: Freiburg’s partially privatised waste disposal company, Abfallwirtschaft und Stadtreinigung Freiburg GmbH (ASF), has therefore been working together with schools and institutions to run courses, organise guided tours, perform a “Theatre of Rubbish” for primary school children and organise competitions like “Waste Not, Want Not”.

THE WAY TO WASTE AVOIDANCE

The local authority is not the only body setting a good example, using nearly 100 % recycled paper and working to stem the flood of disposal cups. Private organisations such as SC Freiburg are also showing their commitment and have joined the “Mehrweggebot” (“reusables”) initiative for events in public spaces that was launched in 1991. The waste disposal system offers further incentives to avoid generating waste: people can choose different sizes of waste bins and emptying intervals. People can also get together to form waste disposal communities and there are financial rewards for people who compost their own green waste or use textile baby nappies.

TREATMENT OF NON-RECYCLABLE WASTE

Since 2005, the region’s non-recyclable waste, that is waste that cannot be avoided or recycled, is incinerated in the Thermal

WASTE TO ENERGY – USE OF A FORMER LANDFILL SITE TO GENERATE ENERGY



The former Eichelbuck landfill site has evolved into an energy-generating mountain: Freiburg’s largest solar installation was erected there in 2011, with a total capacity of 2.5 megawatts peak (MWp), and therefore meets the annual electricity needs of around 1,000 households. And the landfill gas from the 50-metre high, former waste mountain is also used: mixed with biogas from the Reterra biogas plant, it is supplied to a co-generation plant in the Landwasser district and is used to generate electricity and heat. Since mid-2014, an innovative wood gas combined heat and power plant has also been in operation, increasing the proportion of renewable energy in Landwasser’s total energy supply by c. 15 %. The CHP plant together with the two existing biogas and landfill gas motors means that a total of around 3,600 households can now be supplied with green electricity, and 780 households can also be supplied with heat. The wood gas generation module reduces CO₂ emissions by around 750 t annually compared to conventional power plants and separate power generation. The annual CO₂ savings compared to generation with conventional natural gas combined heat and power plants are around 330 t.

Non-recyclable Waste Treatment and Energy Generation Plant (TREA) in the Breisgau Industrial Park to the south of Freiburg. This waste incineration technology combines safety, efficiency and environmental compatibility in a modern way, generating energy and heat in the incineration process. In specific terms, the plant currently supplies around 28,000 households with electricity. Since mid-2016, a total of 12,200 MWh of heat has been generated under contract each year, including 8,000 MWh for a nearby biomass centre, 1000 MWh for a badenova biogas plant, and 3,200 MWh for other district heating clients, most of which are small businesses.

www.tbe-waerme.de

www.abfallwirtschaft-freiburg.de

www.badenova.de





[Experiencing sustainability]

Trade tourism in the Green City



Freiburg has gained an international reputation in fields, such as solar technology, transport policy, environmental and climate protection – sustainability has become a key factor in the city’s image and now plays a major role in the appeal of the city to tourists.

Today there is a never-ending stream of over 25,000 “trade” visitors to the city from around 45 nations every year, but not because the city has spectacular large-scale projects or huge solar factories. It is something else that makes Freiburg such an attractive city and one sought after as a partner: nowhere else are there more pilot projects, more extensive “green” expertise, sensitivity and political experience to be found. The traditional university town has evolved into a modern workshop of the future where people are happy to think innovatively and undogmatically about new ideas for reconciling the art of living and sustainability, ecology and economics.

Freiburg is regarded as a green flagship city, especially in countries like China, South Korea and Japan – local authorities, company representatives, architects and urban planners all want to learn and benefit from Freiburg’s experiences. And the business tourists, who take time out to head off, “green map” in their hand, to cycle through Freiburg on the “Green City” tour, are often pioneers blazing the trail and opening doors to “normal” tourists and to businesses that subsequently relocate to the area.

Freiburg has twelve twin towns, and its experience with environmental policy and renewable energy is one reason why it is so attractive as a potential partner. For example, the city is already involved in a number of collaborative solar projects with Isfahan, and has helped its sister town Padua to build Italy’s largest photovoltaic plant. Madison in the USA is currently planning the construction of a “Sustainability Center” based on the Solar Info Center in Freiburg. Freiburg has an agreement on ongoing exchange in the field of sustainable urban development with the French town of Besançon, and through Lviv in Ukraine, the city has contacts in the network of energy-efficient Ukrainian cities that aims to bring planning for homes and renewable energy up to modern standards. Tel Aviv and Freiburg are cooperating on designing and planning new districts and sharing experience on mobility and the establishment of start-ups.



GREEN CITY TRADE VISITOR SERVICE

Are you interested in experiencing projects and concepts in the Green City of Freiburg at first hand?

Take advantage of our Visitor Service – we’d be glad to help you organise your stay.

City of Freiburg im Breisgau

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Trade fairs and conferences: Freiburg, the meeting place for the international environmental industries



EUROPEAN ENVIRONMENT FOUNDATION

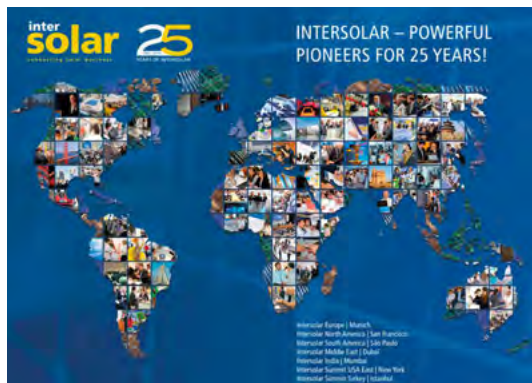
INTERNATIONAL CONVENTION OF ENVIRONMENTAL LAUREATES FREIBURG GERMANY



EUROPEAN ENVIRONMENT FOUNDATION

A GLOBAL NETWORK OF ENVIRONMENTAL LAUREATES

A wealth of trade fairs and conferences on environmental issues are testament to Freiburg's solar and environmental expertise. Since it was launched in 2000, Intersolar has become the leading trade fair for the European solar technology sector. After eight successful years, Intersolar regrettably had to bid farewell to Freiburg to find more space elsewhere and now attracts over 50,000 visitors and 1,300 exhibitors to Munich. Intersolar is now a fixture on other continents as well: with its accompanying conference, it now offers a first-class venue in San Francisco, Mumbai, Beijing and Sao Paulo, bringing together companies, technologies, and especially people from the major global markets. From 2014 on, Intersolar will be expanding its services with Inter-solar Summits in the U.S., South America and India, offering companies new access routes to emerging growth markets.



Apart from its role as organiser, the City of Freiburg is also represented as a Green City at trade fairs, showcasing sustainable plans and projects on its exhibition stand, at Green Cities conference sessions and in exchanges with local business promoters and companies. A large number of events are also held in Freiburg itself: Gebäude.Energie.Technik (GETEC) is the leading trade fair for energy-efficient modernisation, renovation and construction, the "Congress for Energy-autonomous Municipalities" provides a platform for discussions about the challenges and opportunities of local alternative energy systems and the Solar Summit is the annual meeting point for the international solar community, attended by leading players from the worlds of science, industry and politics. A further industry congress on renewable energy and energy-efficiency has been held in Freiburg since 2007: Local Renewables Freiburg, hosted by the City of Freiburg and ICLEI, the international alliance of local authorities (Local Governments for Sustainability). The congress provides an opportunity for exchanges on research, development and the practical application of renewable energies.

Since 2012, the European Environment Foundation (EEF) has invited over a hundred winners of prestigious environmental prizes from more than 40 nations to the annual International Convention of Environmental Laureates. The aim is to promote long-term personal exchange between visionaries and pioneers in the international environmental movement. The Freiburg Convention, under the patronage of Prof. Klaus Töpfer, is the only event of its kind in the world.

www.european-environment-foundation.eu

The EEF pursues its networking strategy on the World Wide Web with its online platform EnviroNetwork.eu. The platform puts environmental laureates in direct contact with NGOs, companies, associations, research and initiatives. Personal profiles, a forum for discussion and a platform of current environmental protection projects give a clear overview of current developments.

www.environetwork.eu



FREIBURG'S PRESENTATION AT EXPO SHANGHAI 2010

The Green City's most prestigious presentation to date was given at the 2010 World Expo in Shanghai in the Urban Best Practice Area where it competed on equal terms with cities, such as Seoul, Barcelona, Montreal, Sao Paulo, Osaka and London. Over a period of six months, the Green City attracted more than 920,000 visitors to its pavilion and showcased itself at the largest world exhibition of all times as a successful city where people enjoy a good quality of life and as a European flagship authority in terms of climate protection. Freiburg's interpretation of sustainability as a guiding principle for urban development engaged and resonated with visitors and earned the professional recognition of experts from around the world. Together with the other participating cities, the city made one thing abundantly clear: it is above all local authorities which have special responsibility for the world of tomorrow.

www.expo2010.freiburg.de

- www.intersolarglobal.com
- www.getec-freiburg.de
- www.energieautonome-kommunen.de
- www.sustainability-summit.de
- www.local-renewables-conference.org



[Citizens' Commitment]

Thinking globally, acting locally – Freiburg is on board

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The UN Conference on Environment and Development in Rio de Janeiro adopted Agenda 21 in 1992. Local authorities were thus given a key role in implementing sustainable development. Signing the Aalborg Charter for sustainable development in 1996, Freiburg's efforts for greater sustainability were shaped primarily by Local Agenda 21. The projects and efforts formulated in Local Agenda 21 for a successful sustainability process were expanded to include aspects of administrative modernisation and management. The City of Freiburg signed the Aalborg Commitments in 2006, committing itself to sustainable development based on twelve overarching policy areas, each with five strategic objectives, which have since served as the basis for all political action.

Sustainable projects, supported and carried by the citizens, are extraordinarily diverse. Freiburg mucks in – literally! Apart from sponsoring urban trees, playgrounds and parks, the people of Freiburg take part in urban gardening, for instance in the Vauban WandelGarten, the Transition Garden, clean-up operations and many more urban ecological projects.

For example, the One World Forum organises the Freiburg One World Days and markets fair-trade coffee from Nicaragua. Freiburg's Eco-Station and fesa e.V. draw children's and young people's attention to their global responsibility towards environmental protection with projects like "Don't worry, be fair," "The Blue Treasure Chest" and the Freiburg Climate Rally. The Saturday Forum, run by Ecotrinova e.V. and the University, has been offering lectures and excursions on climate protection and sustainable development for many years.

These projects play a key role in the local sustainability process, helping groups, initiatives and citizens to cooperate and network. Sustainable development is lived and breathed in Freiburg and totally supported by its people: their commitment is the basis for the future sustainable development of the city.

www.agenda21-freiburg.de
www.freiburg.de/nachhaltigkeitsmanagement
www.oekostation.de
www.fesa.de



Seeing, listening, knowing – Environmental education in Freiburg

“You only see what you’re aware of, and you only protect what you know.” The slogan for Freiburg’s Nature Trail is as valid as ever – after all, environmental protection and nature conservation have to offer specific experiences and direct, hands-on adventures if they are to be successful. Environmental education begins in nursery schools and primary schools and plays an essential role in the awareness of sustainable development.



ENVIRONMENTAL EDUCATION IN SCHOOLS

A number of initiative groups, projects and bright ideas, like the benefit run to raise funds to expand a school’s own solar installation or to renaturalise a section of stream, are testament to how committed Freiburg’s schools are to climate protection. Many of these waste avoidance, water-saving and energy-saving projects are supported by money and equipment from the City of Freiburg.



EXTRA-CURRICULAR LEARNING OPPORTUNITIES

Outside of schools as well there are a whole series of opportunities for learning about the environment under the supervision of the City of Freiburg – from the young to the young-at-heart.

The Municipal Forestry Office therefore maintains nature adventure and forest trails, offers guided tours and project days for school classes or supports private forest nurseries with the provision of sites and forestry know-how to enable fun-based access to the woodland ecosystem.

The WaldHaus Freiburg serves as a Centre of Expertise on issues of woodland and sustainability, pooling and professionalising services relating to forestry education and environmental education. It also encourages interdisciplinary discussions about the issues of woodland and sustainability across national borders.

Since it was set up in 1986, the Freiburg Oekostation, the Environment and Nature Conservation League’s (BUND) environment centre in the Seepark, has been running seminars, guided tours and events covering the entire range of environmental issues, from solar energy to green building.

The Stadtgut Mundenhof is an animal enclosure, organic farm and nature education centre in one. As part of the KonTiKi project, children and school classes learn how to handle pets from all over the world and learn lots of interesting facts about the proper way to keep pets, nature conservation and environmental protection in a fun-filled way.

Freiburg Planetarium does not only look out at distant galaxies but also focuses on the planet Earth and its biosphere. Issues, like the water cycle, greenhouse effect or the importance of the sun for the energy supply of the future, are illustrated in programmes, like “The Secret of the Trees”.

“Freiburg ScienceNet Region” ONLINE GUIDE

Since it was set up in July 2007, teachers, students and other interested parties can use this online portal to gain an overview of over 250 extra-curricular environmental education courses provided by over 60 different institutions.

“EDUCATION FOR SUSTAINABLE DEVELOPMENT” FUND

At the start of 2013, the Municipal Council of the City of Freiburg resolved to set up a fund for “Education for Sustainable Development”, which supports educational providers for all ages. Application is open to all institutions, associations, organisations, project managers and individuals who offer education and training on specific topics. The classes offered must meet the criteria set out in the “Freiburger Kleeblatts Nachhaltigkeit Lernen” sustainability information system.

The cloverleaf illustrates key issues, such as energy, food, transport or consumption, viewed from the four perspectives of sustainability – environmental protection, sustainable economic development, social justice and culture. The “Education for Sustainable Development” Fund has an annual funding figure of € 40,000. A judging panel decides on the funding of the projects submitted.

www.leif-freiburg.de
www.freiburg.de/forstamt
www.waldhaus-freiburg.de
www.oekostation.de

www.freiburg.de/mundenhof
www.freiburg.de/planetarium
www.sciencenet-region-freiburg.de
www.zee-uni-freiburg.de



[Green for "Go!"]

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Green Cities are Growing Cities

Sustainability, future viability and quality of life are the driving forces behind Freiburg's long-term business development policy, which has put Freiburg on track for high-quality growth. Sustainability is not simply a matter of ambitious environmental and climate protection plans for the "Green City" but rather the driving force for the positive development of its economy, education and science.

Freiburg's targeted promotion of sustainable environmental, solar and bio technologies in recent years have given the city a decisive edge in international competitive environments and done much to enhance the appeal of the city and the quality of life it offers. Freiburg's approach to life, lifestyle and culture are appreciated by locals, but also attract students, creative minds and investors from around the world, ensuring that the population continues to grow steadily and creating the cornerstones for the city's knowledge-based, socially equitable and economically successful development.

Today Freiburg leads the country in terms of job creation, population and economic growth, as well as by the number of overnight stays. Freiburg's above-average employment figures in the environmental management, education and research sectors, coupled with the growth in interest from Germany and abroad, reflect the great significance and high value placed on the sustainable urban development practised here.





<ul style="list-style-type: none"> Environmental award for outstanding achievements in municipal climate protection 	<ul style="list-style-type: none"> European Local Public Transport Award 	<ul style="list-style-type: none"> Dubai Award: "Freiburg-Vauban – Sustainable Model District" 	<ul style="list-style-type: none"> Future-viable local authority 	<ul style="list-style-type: none"> 1st place in the Solar Federal League 	<ul style="list-style-type: none"> Climate Star 	<ul style="list-style-type: none"> Sustania 100 & UN City of the Decade 	<ul style="list-style-type: none"> Cycle-friendliest city in Baden-Württemberg 									
1987	1990	1992	1995	2000	2002	2003	2004	2005	2006	2007	2009	2010	2011	2012	2013	2016
<ul style="list-style-type: none"> Eco-capital 	<ul style="list-style-type: none"> German Green Capital 	<ul style="list-style-type: none"> Honoured as a "Region of the Future" 	<ul style="list-style-type: none"> 1st place in the Solar Federal League 	<ul style="list-style-type: none"> 1st prize for sustainable, ecological building in "Vauban" 1st place in the Solar Federal League 	<ul style="list-style-type: none"> European OSMOSE Award 	<ul style="list-style-type: none"> Federal Climate Protection Capital The European City of the Year 	<ul style="list-style-type: none"> First German Sustainability Award for cities and towns in the category: Most Sustainable City in Germany 	<ul style="list-style-type: none"> Euro-China Green and Smart City Awards 								

Multi-award-winning



In Freiburg, sustainability and economic dynamism, a down-to-earth approach and future viability, scientific excellence, a genial art of living and quality of life, all point to a common goal. As a flagship "Green City", Freiburg has become a successful role model in Germany and Europe and is working in an ambitious and targeted way to continue its evolution towards a sustainable future.

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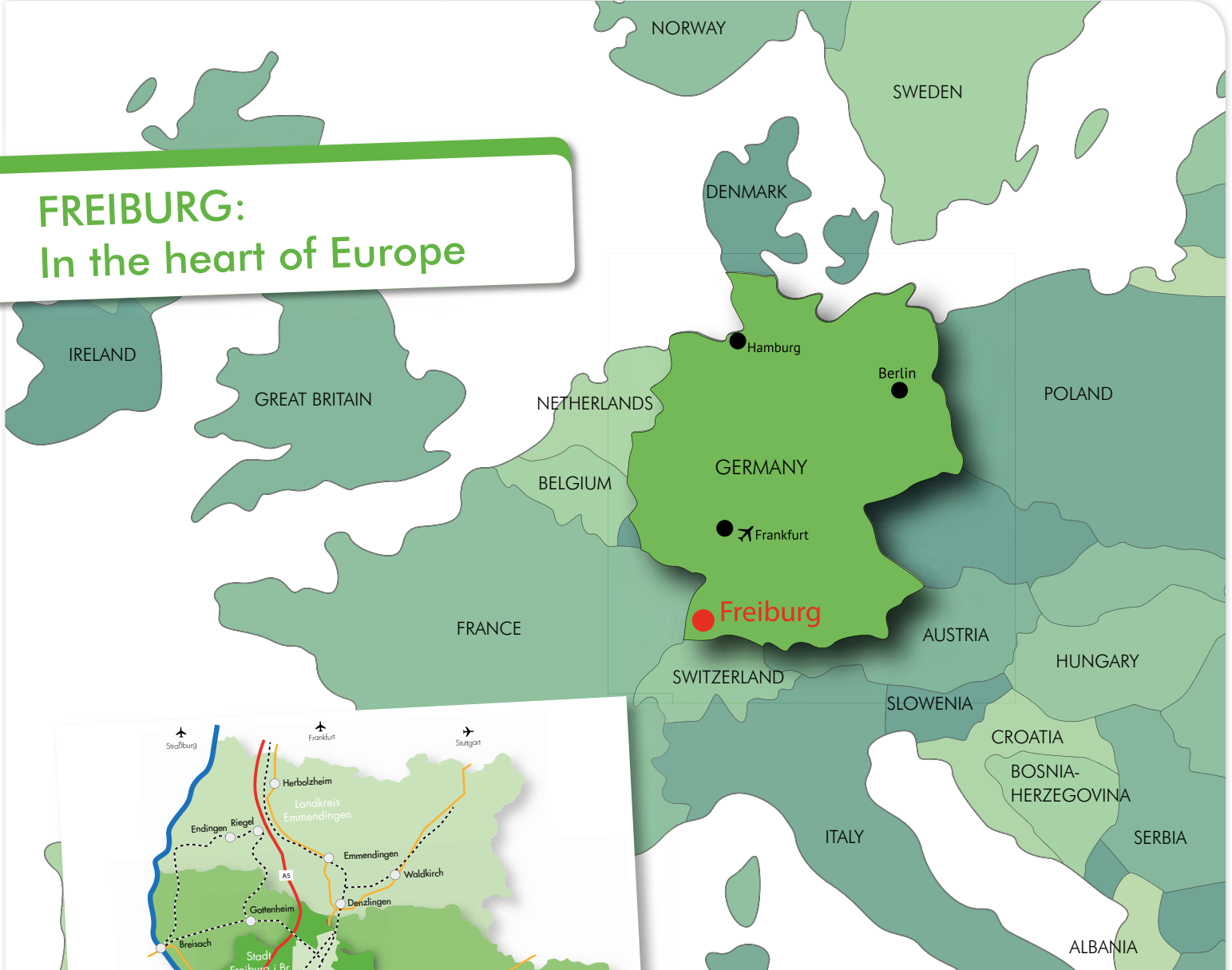
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FREIBURG: In the heart of Europe



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